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EXAMINER

DOE, JANIS L

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/601,859	Applicant(s) LIM ET AL.	
	Examiner Janis L. Dote	Art Unit 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. The disclosure is objected to because of the following informalities:

There are numerous misspellings throughout the specification. For the example, "phthalocyan" and "enaminstylbene."

Appropriate correction is required.

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

(1) In claims 5-7, 13, and 14, the recited mixture comprising the "charge transfer material" and "polycarbonate" lacks antecedent basis in the specification. See paragraph 0019 of the specification, which discloses a mixture that comprises the charge generating material, the solvent 1,1,2-trichloroethane, and the polycarbonate of formula 5. The specification does not disclose the presence of the charge transfer material in the mixture. Furthermore, the term "polycarbonate" recited in instant claim 5 is broader than the disclosed polycarbonate of formula 5 because it encompasses polycarbonates that are not represented by formula 5.

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(2) In claim 9, the recited dispersion liquid comprising the charge generating material and the polyethylene terephthalate polymer of the formula recited in instant claim 9 lacks antecedent basis in the specification. See paragraph 0026 of the specification, which discloses that the charge generating material is dispersed with a binder resin, which can be those listed in paragraph 0026 of the specification, to form a dispersion liquid. The list of binder resins in paragraph 0026 does not include the polyethylene terephthalate polymer of the formula recited in instant claim 9. Paragraph 0030 of the specification discloses that the binder resin in the dispersion coating liquid may be the polyethylene terephthalate polymer of the formula recited in instant claim 9, which differs from the binder resin used in the dispersion liquid.

(3) In claim 9, the recitation of coating the coating liquid onto "a substrate of a drum or cartridge" lacks antecedent basis in the specification. See paragraph 0030 of the specification, which discloses coating the coating liquid "on the substrate, for example, on the aluminum drum." There is no disclosure of coating a cartridge. Furthermore, the term "drum" recited in instant claim 9 is broader than the disclosed aluminum drum because it includes drums that are not aluminum.

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3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3 and 5-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3 and 11 are indefinite in the term "enaminstylbene [sic] polymer" because it is not clear what is meant by the term. The instant specification does not provide a definition of the term. Nor does the specification provide a chemical structure or formula of said polymer or examples of the polymer.

Claims 5-7 are indefinite because it is not clear how the charge generating material is included in a dispersion liquid comprising the charge transfer material and a polycarbonate, when the charge generating material and charge transfer material are present on a substrate in the single-layered photoreceptor.

Claim 6 is indefinite in the phrase "polycarbonate is in the range of 10 wt% to 90 wt%" because it is not clear what is the basis of said weight percentage, e.g., the dispersion

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liquid, the single layer, or the amount of the polyester resin, charge transfer material, or charge generating material.

Claim 8 is indefinite in the phrase "the binder resin further includes polycarbonate" because it is outside the scope of instant claim 1, from which claim 8 depends. Claim 1 recites that the "binder resin is a polyethylene terephthalate polymer" of the formula recited in instant claim 1.

Claim 9 is indefinite in the phrase "straining out dispersing materials to obtain a dispersion liquid" (emphasis added) for lack of antecedent basis in claim 9. Claim 9 previously recites the step of dispersing a binder resin, a solvent, and the titanyloxy phthalocyanine. Claim 9 does not recite that the dispersion step includes the addition of dispersing materials.

Claims 13 and 14 are indefinite for lack of unambiguous antecedent basis in claim 9, from which claim 13 depends. Claim 9 recites forming a dispersion liquid comprising a binder resin, a solvent, and the titanyloxy phthalocyanine, where the binder resin is the polyethylene terephthalate polymer of the formula recited in claim 9. Claim 9 does not recite that the dispersion liquid comprises the charge transfer material and polycarbonate. Rather, claim 9 recites forming a "dissolved charge transfer material" that comprises the charge transfer

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material, which is mixed with the dispersion liquid to form a coating liquid.

Claim 14 is further indefinite in the phrase "polycarbonate is in the range of 10 wt% to 90 wt%" because it is not clear what is the basis of said weight percentage, e.g., the dispersion liquid, the coating liquid, or the amount of the polyester resin, charge transfer material, or charge generating material.

Claim 16 is indefinite in the phrase "the binder resin further includes polycarbonate and is a mixture of polycarbonate and polyethylene terephthalate [sic] polymer . . ." (emphasis added) for lack of unambiguous antecedent basis in claim 9, from which claim 16 depends. It is not clear to what binder resin recited in instant claim 9 "the binder resin" recited in instant claim 16 refers, e.g., the binder resin in the dispersion liquid or the binder resin in the dissolved charge transfer material.

If the binder resin recited in claim 16 refers to the binder resin used in the dispersion liquid, claim 16 is indefinite because it is outside the scope of instant claim 9, which recites that the "binder resin [in the liquid dispersion] is a polyethylene terephthalate polymer" of the formula recited in instant claim 9.

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Claim 17 is indefinite in the phrase "photoreceptor in a photoreceptor cartridge of an image forming apparatus"

(emphasis added) because it is not clear whether the phrase "in a photoreceptor cartridge . . ." is a merely a recitation of intended use, or whether the claim is claiming an image forming apparatus.

Claim 19 is indefinite in the phrase "photoreceptor installed in a photoreceptor drum of an image forming apparatus"

(emphasis added) because it is not clear whether the phrase "installed in a photoreceptor drum . . ." is a merely a recitation of intended use, or whether the claim is claiming an image forming apparatus. Furthermore, it is not clear how a photoreceptor comprising a substrate is "installed" in a photoreceptor drum.

5. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted element is an electrically conductive substrate.

Instant claims 1-8 and 17-20 recite a single-layered electrophotographic photoreceptor comprising a charge generating

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material, a binder resin, and a charge transfer material on "a substrate."

Instant claims 9-16 recite a method of manufacturing a single-layered electrophotographic photoreceptor comprising the steps of coating a coating liquid onto "a substrate of a drum or cartridge."

The claims fail to recite that the electrophotographic photoreceptor has an electrically conductive support. It is not clear how an electrophotographic photoreceptor that lacks a conductive support can form an electrostatic latent image. An electrically conductive support is an essential component of an electrophotographic photoreceptor to form an "electrostatic latent image." See Diamond, Handbook of Imaging Materials, pp. 395-396. Diamond Figure 9.7 illustrates a typical dual-layer photoreceptor, which comprises an electrode layer. Diamond discloses that the photoreceptor may comprise a single layer that functions as a charge generation layer and a charge transport layer. Diamond, page 395, lines 25-27. It is not clear how electrophotographic photoreceptors that lack an electrically conductive substrate can form an electrostatic latent image. All the examples in the instant specification exemplify photoreceptors comprising an aluminum drum as the substrate. See the instant specification, page 8,

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paragraph 0035. There is no objective evidence on the present record showing that electrostatic latent images can be formed on a photoreceptor comprising a non-conductive or insulating substrate.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. An electrically conductive substrate is critical or essential to the practice of the invention. The instant claims do not recite the presence of an electrically conductive substrate. Therefore, the instant claims are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Instant claims 1-8 and 17-20 recite electrophotographic single-layered photoreceptors as described in paragraph 5, supra, which is incorporated herein by reference. Instant claims 9-16 recite a method of making an electrophotographic

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single-layered photoreceptor as described in paragraph 5, supra, which is incorporated herein by reference.

For the reasons given in paragraph 5, supra, it is not clear how electrophotographic photoreceptors that lack an electrically conductive substrate can form an electrostatic latent image. There is no objective evidence on the present record showing that electrostatic latent images can be formed on a photoreceptor comprising a non-conductive or insulating substrate. All the examples in the instant specification and in the prior art (e.g., Diamond, supra) exemplify photoreceptors comprising an aluminum drum as the substrate. See the instant specification, page 8, paragraph 0035. Thus, all the evidence in the instant specification indicates that an electrophotographic photoreceptor that does not comprise an electrically conductive substrate cannot form an electrostatic latent image. Hence, on the present record, it would require undue experimentation for one of ordinary skill in the art to make and use an electrophotographic photoreceptor that does not have an electrically conductive substrate to form an electrostatic latent image. The full scope of the instant claimed subject matter cannot be practiced based on the limited disclosure provided by the instant specification.

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8. Claims 3, 8, 11, and 16 are objected to because of the following informalities:

In claims 3 and 11, the misspelling "enaminstylbene."

In claims 8 and 16, the misspelling "therephthalate."

Appropriate correction is required.

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

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11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f), or (g) prior art under 35 U.S.C. 103(a).

12. In the interest of compact prosecution, the examiner has interpreted the language recited in instant claims 5-7 as a product-by-process limitation.

The examiner has assumed, arbitrarily, that the basis of the weight percentage of the polycarbonate resin is based on the weight of the solid content in the single layer.

The examiner has interpreted the language recited in claims 17 and 18 as reciting an image forming apparatus comprising a photoreceptor cartridge that comprises the single-layered photoreceptor.

The examiner has interpreted the language recited in instant claims 19 and 20 as reciting an image forming apparatus comprising the single-layered photoreceptor that comprises a drum having thereon a photoreceptive layer.

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Rejections based on these interpretations are set forth infra.

13. Claims 1, 2, and 17-20 are rejected under 35 U.S.C. 102(e) as being anticipated by US 2004/0009419 A1 (Yokota), as evidenced by ACS File Registry RN 26201-32-1, Japanese Patent 01-299874 (JP'874), and the Japanese Patent Office (JPO) English language abstract describing JP'874.

Yokota discloses a single-layered photoreceptor comprising an aluminum drum having thereon a photoconductive layer comprising γ -titanyl phthalocyanine, a hole transport material, an electron transport material, and the polyester resin associated with the trademark O-PET obtained from KANEBO. Example 1 in paragraphs 0051 and 0052. The polyester resin associated with the trademark O-PET is represented by Yokota's formula 6. See paragraphs 0037 and 0038. The polyester resin disclosed by Yokota meets the polyester resin composition recited in the instant claims. Yokota further discloses an electrophotographic imaging apparatus 30 comprising an electrophotographic cartridge 21 that comprises photoreceptor drum 28. See Fig. 3 and paragraphs 0077 and 0078.

Yokota does not disclose that the γ -titanyl phthalocyanine has at least 2 main peaks at Bragg angles in the range of 9.5° to

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27.3° as recited in the instant claims. However, as evidenced by JP'874 and the ACS File Registry Number RN 26201-32-01, it is well-known in the art that the titanyl phthalocyanine (TiOPc) has the chemical structure as recited in the instant claims.

See also the JPO abstract, and JP'874, page 7, col. 1, lines 5-11. It is also well-known in the art that γ -titanyl phthalocyanine provides an $\text{CuK}\alpha$ X-ray diffraction pattern having peaks at the Bragg angles $2\theta \pm 0.2^\circ$ of 17.7° , 24.0° , and 27.2° , which are within the range recited in the instant claims. See the JPO abstract, and JP'874, page 7, col. 2, lines 12, and Fig. 1.

14. Claims 1, 2, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent 10-020515 (JP'515), as evidenced by the ACS File Registry Number RN 26201-32-1, Japanese Patent 61-271050 (JP'050), and the JPO English language abstract describing JP'050. See the JPO machine-assisted English language translation of JP'515 for cites.

JP'515 discloses a single-layered photoreceptor comprising an aluminum drum having thereon a photoconductive layer comprising alpha titanylphthalocyanine, a hole transport material, an electron transport material, a polycarbonate resin, and the polyester resin associated with the trademark O-PET

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obtained from Kanebo, Ltd. See the translation, paragraphs 0046-0055, and example 3 in paragraph 0059. The polyester resin associated with the trademark O-PET is a copolymer comprising the units represented by JP'515 formula 11 and ethylene terephthalate. The polyester resin disclosed by JP'515 meets the polyester resin composition recited in the instant claims. The polycarbonate and polyester resins are each present in an amount of 7 parts by weight. Thus, the weight ratio of the polycarbonate to the polyester is 1:1, which is within the range of 1:99 to 99:1 recited in instant claim 8.

JP'515 does not disclose that the alpha titanyl phthalocyanine has at least 2 main peaks at Bragg angles in the range of 9.5° to 27.3° as recited in the instant claims. However, as evidenced by the ACS File Registry Number RN 26201-32-1 and JP'050, it is well-known in the art that titanyl phthalocyanine (TiOPc) has the chemical structure as recited in the instant claims. See also the JPO abstract describing JP'050, and JP'050, page 3, col. 1, lines 1-7. It is also well-known in the art that alpha titanyl phthalocyanine provides an $\text{CuK}\alpha$ X-ray diffraction pattern having peaks at the Bragg angles $2\theta \pm 0.2^{\circ}$ of 12.5° , 16.3° , and 25.3° , which are within the range recited in the instant claims. See the JPO abstract describing JP'050, and JP'050, page 3, col. 1, lines 17-23, and Fig. 1.

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15. Claims 5-7 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP'515, as evidenced by the ACS File Registry Number RN 26201-32-1, JP'050, and the JPO English language abstract describing JP'050. See the JPO machine-assisted English translation of JP'515 for cites.

JP'515 discloses a single-layered photoreceptor as described in paragraph 14 above, which is incorporated herein by reference. As discussed in paragraph 14 above, the polycarbonate resin and polyester resin are present in the layer in a weight ratio of 1:1.

Instant claims 5-7 are written in product-by-process format. JP'515 does not exemplify forming the photoconductive layer as recited in the instant claims. JP'515 discloses forming a dispersion by dispersing the alpha titanylphthalocyanine, the hole transport material, the electron transport material, and polycarbonate in chloroform, where the polycarbonate is present in an amount of 26.6 wt% based on the amount of solids in the layer. The amount of 26.6 wt% is within the range of 10 to 90 wt% recited in instant claim 6. The amount of 26.6 wt% is determined from the information provided in example 3 of JP'515. Furthermore, as

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discussed in paragraph 14 above, the single-layered photoreceptor disclosed by JP'515 meets the compositional limitations recited in the instant claims. Accordingly, the photoreceptor disclosed by JP'515 appears to be the same or substantially the same as the photoreceptor made by the method recited in the instant claims. The burden is on applicants to prove otherwise. In re Marosi, 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985); MPEP 2113.

16. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,430,526 (Ohkubo) combined with JP'515, as evidenced by the ACS File Registry Number RN 26201-32-1, JP'050, and the JPO English language abstract describing JP'050. See the JPO machine-assisted English translation of JP'515 for cites.

Ohkubo discloses an electrophotographic image forming apparatus as recited in instant claims 19 and 20, but for the particular single-layered photoreceptor. Fig. 1 and col. 2, line 56, to col. 3, line 56. Ohkubo also discloses an imaging apparatus comprising a process cartridge as recited in instant claims 17 and 18, but for the particular single-layered photoreceptor. Fig. 2 and col. 3, line 58, to col. 4, line 8. Ohkubo discloses that the charging member is a contact charging

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roller. An oscillating voltage is applied to the charging roller in the form of a DC-biased AC voltage. The peak-to-peak voltage of the oscillating voltage is not less than twice the absolute value of a "charge starting voltage" relative to the photosensitive member. Said oscillating voltage provides uniform charging. Ohkubo discloses that "uneven charging hardly occurs in a regular developer or a reverse development process." Col. 1, lines 36-42, col. 3, line 64, to col. 4, line 5, col. 4, lines 9-17.

Ohkubo does not disclose the use of the single-layered photoreceptor recited in the instant claims. However, Ohkubo does not limit the type of photoreceptor used. Col. 4, lines 29-35.

JP'515, as evidenced by the other cited references, discloses an electrophotographic single-layered photoreceptor drum that is within the compositional limitations recited in the instant claims. The discussions of JP'515 in paragraph 14 above is incorporated herein by reference. According to JP'515, its photoreceptor has superior film strength and electric characteristics, and good "repetition characteristics." Translation, paragraphs 0001, 0011, 0076 and 0077.

It would have been obvious for a person having ordinary skill in the art to use the single-layered photoreceptor drum

disclosed by JP'515 as the photoreceptor drum in the apparatus and process cartridge disclosed by Ohkubo, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic apparatus and process cartridge that have excellent electric characteristics and good "repetition characteristics."

17. Claims 1, 2, 4, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent 2000-075509 (JP'509), as evidenced by the ACS File Registry Number RN 26201-32-1, JP'050, and the JPO English language abstract describing JP'050, combined with JP'515. See the JPO machine-assisted English translations of JP'509 and JP'515 for cites.

JP'509 discloses a single-layered photoreceptor comprising an aluminum drum having thereon a photoconductive layer comprising alpha titanylphthalocyanine, a hole transport material, a fluorenylidene malononitrile electron transport compound of formula (5), and a binder resin. See the translation of JP'505, paragraphs 0038-0044, and example 4 in paragraph 0051-0053. The fluorenylidene malononitrile compound of formula (5) meets the electron transport material compositional limitation recited in instant claim 4.

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JP'509 does not disclose that the alpha titanyl phthalocyanine has at least 2 main peaks at Bragg angles in the range of 9.5° to 27.3° as recited in the instant claims. However, as evidenced by JP'050 and the ACS File Registry Number RN 26201-32-1, it is well-known in the art that the alpha titanyl phthalocyanine has the chemical structure and the X-ray diffraction pattern as recited in the instant claims. The discussions of JP'050, the abstract describing JP'050, and the ACS File Registry Number RN 26201-32-1 set forth in paragraph 14 above are incorporated herein by reference.

JP'509 does not disclose that the binder resin comprises the polyester resin recited in the instant claims. However, JP'509 discloses that the binder resin may be a polyester resin. JP'509 further teaches that the binder resin may also be a mixture of two or more different resins. Translation of JP'509, paragraph 0024, lines 2 and 9.

JP'515 teaches that the binder resin in a single-layered photoreceptor may comprise a polyester resin comprising a biphenylfluorene structure associated with the trademark O-PET obtained from Kanebo, Ltd., and a polycarbonate resin. Translation of JP'515, paragraphs 0012-0014 and 0034. JP'515 discloses that the polyester comprising a biphenylfluorene structure may be the polyester associated with the trademark

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O-PET, which is a copolymer comprising the units represented by JP'515 formula 11 and ethylene terephthalate. Translation, paragraphs 0034 and 0060-0061. The polyester resin O-PET disclosed by JP'515 meets the polyester resin composition recited in the instant claims. JP'515 teaches that the polyester resin may be present in the weight ratio of 5 to 100 parts by weight to 100 parts by weight of the polycarbonate resin. The weight ratio is within the weight ratio range of 1:99 to 99:1 recited in instant claim 8. According to JP'515, when its binder resin is used as the binder resin in a single-layered photoreceptor, the photoreceptor has superior film strength and electric characteristics in positive charging, and good repetition characteristics. Translation of JP'515, paragraphs 0001, 0011, 0076, and 0077.

It would have been obvious for a person having ordinary skill in the art to use the binder resin taught by JP'515 as the binder resin in the single-layered photoreceptor disclosed by JP'509, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic single-layered photoreceptor having the benefits disclosed by JP'515.

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18. Claims 1-4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/00228534 A1 (Zhu), as evidenced by applicants' admission in paragraph 0033 of the instant specification of the chemical identity of the material associated with the tradename MPCT 10 obtained from Mitshubishi [sic: Mitsubishi] Paper Mill Co., combined with US 6,528,645 B1 (Hamasaki) and JP'515. See the JPO translation of JP'515 for cites.

Zhu discloses a single-layered photoreceptor comprising a an aluminum coated substrate having thereon a photoconductive layer comprising titanylphthalocyanine, an enamine-stilbene based the hole transport material associated with the trademark MPCT-10 obtained from Mitsubishi Paper Mills, the electron transport compound (4-n-butoxy-9-fluorenylidene)malononitrile, and a polyvinylbutyral binder resin. Paragraphs 0065-0067 and preparation of examples 1-3 at paragraph 0069. The electron transport compound is within the compositional limitation recited in instant claim 4. Zhu does not identify the hole transport material MPCT-10 as an enamine-stilbene polymer as recited in instant claim 3. However, the instant specification in paragraph 0033 identifies the tradename MPCT-10 as a "charge transfer material of enaminstylbene [sic] polymer."

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Zhu does not disclose that the titanyl phthalocyanine has at least 2 main peaks at Bragg angles in the range of 9.5° to 27.3° as recited in the instant claims.

Hamasaki discloses titanyl phthalocyanine crystals that exhibit a maximum peak in the powder X-ray diffraction pattern at the Bragg angle $2\theta \pm 0.2$ of 27.2° , and main peaks at Bragg angles 9.5° and 24.1° . See col. 6, lines 3-39, and, for example, Preparation example 1 at cols. 20-21, col. 23, lines 16-20, and Figs. 2 and 3. Hamasaki's titanyl phthalocyanine crystals are within the compositional limitations recited in the instant claims. According to Hamasaki, when its titanyl phthalocyanine crystals are used in positively charged single layer photosensitive layers, the layers have good sensitivity characteristics "that are always stable regardless of the lapsed time after preparing the coating solution" comprising said titanyl phthalocyanine crystals. Col. 3, lines 64-67, and Table 2, examples 1-12.

It would have been obvious for a person having ordinary skill in the art to use Hamasaki's titanyl phthalocyanine crystals as the titanyl phthalocyanine charge generating material in the photoreceptor disclosed by Zhu, because that person would have had a reasonable expectation of successfully

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obtaining a positively charged single-layered photoreceptor having good stable sensitivity characteristics.

Zhu also does not disclose that the binder resin may be the polyester resin recited in the instant claims. However, Zhu discloses that the binder resin used in the single-layered photoreceptor may be a polycarbonate resin or a polyester resin. Zhu also discloses that the binder resin may be a combination of resins. Paragraph 0038, lines 11, 13, and 18-19.

JP'515 teaches that the binder resin in a single-layered photoreceptor may comprise a polycarbonate resin and a polyester resin comprising a biphenylfluorene structure that meets the polyester compositional limitation recited in the instant claims. The discussion of JP'515 in paragraph 17, supra, is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in JP'515, to use the binder resin taught by JP'515 as the binder resin in the single-layered photoreceptor rendered obvious over the combined teachings of Zhu and Hamasaki, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic single-layered photoreceptor having the benefits disclosed by JP'515.

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19. Claims 9-12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhu, as evidenced by applicants' admission in paragraph 0033 of the instant specification of the chemical identity of the material associated with the tradename MPCT 10 obtained from Mitshubishi [sic: Mitsubishi] Paper Mill Co., combined with Hamasaki and JP'515, further combined with US 6,284,031 B1 (Healy). See the JPO translation of JP'515 for cites.

Zhu combined with the teachings in Hamasaki and JP'515 renders obvious a single-layered photoreceptor as described in paragraph 18 above, which is incorporated herein by reference.

Zhu further teaches that said single-layered photoreceptor is obtained by the following steps: (1) milling the titanylphthalocyanine and the binder resin in a solvent with zirconium beads to form a pigment dispersion liquid; (2) mixing the binder resin with the hole transport material and electron transport material, and a solvent to form a solution; (3) mixing the dispersion liquid of step (1) with the solution of step (2) to form a coating liquid; and (4) coating the aluminum coated substrate with the coating liquid of step (4) to form the single-layered photoreceptor drum. See Zhu, paragraphs 0067 and 0069.

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Zhu does not explicitly disclose removing the milling zirconium beads from the pigment dispersion liquid after formation of said dispersion liquid. However, Zhu does not disclose that the zirconium beads are part of the single-layered photoreceptor. Moreover, it is well-known in the art of forming pigment dispersions to remove the milling beads after forming the pigment dispersion liquids. See Healy, col. 7, lines 64-67, which discloses that after forming a pigment dispersion liquid, the dispersion liquid is strained through a cone sieve to remove the milling beads.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Hamasaki and JP'515, to use the titanyl phthalocyanine disclosed by Hamasaki as the titanyl phthalocyanine charging material and the binder resin disclosed by JP'515 as the binder resin in the method disclosed by Zhu, because that person would have had a reasonable expectation of successfully obtaining a single-layered photoreceptor having the benefits disclosed by Hamasaki and JP'515. It would have also obvious for that person, in view of the teachings in Healy, to remove the milling zirconium beads from the pigment dispersion liquid in method rendered obvious over the combined teachings of Zhu, Hamasaki, and JP'515, because that person would have had a reasonable expectation of

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successfully removing the milling beads used to form the pigment dispersion liquid and obtaining a single-layered photoreceptor having the benefits disclosed by Hamasaki and JP'515.

20. Claims 1, 2, 4, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2004/0096761 A1 (Lin), as evidenced by the ACS File Registry Number RN 26201-32-1 and US 5,350,844 (Martin), combined with JP'515. See the JPO translation for cites.

Lin discloses a single-layered photoreceptor comprising a aluminum drum having thereon a photoconductive layer comprising Type IV titanylphthalocyanine, a hole transport material, an electron transport compound, and a polycarbonate binder resin. Example 1 at paragraphs 0062-0063.

Lin does not exemplify the use of an electron transport compound as recited in instant claims 4 and 12. However, Lin teaches that the electron transport compound may equally be (4-n-butoxycarbonyl-9-fluorenylidene) malononitrile, which meets the electron transport material compositional limitation recited in instant claim 4. Paragraph 0049.

Lin does not disclose that the Type IV titanyl phthalocyanine has at least 2 main peaks at Bragg angles in the range of 9.5 to 27.3°. However, as evidenced by the ACS File

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Registry Number RN 26201-32-1, it is well-known in the art that titanyl phthalocyanine has the chemical structure recited in the instant claims. Martin discloses that the Type IV titanyl phthalocyanine provides a X-ray diffraction pattern having at least two peaks at the Bragg angles $2\theta \pm 0.2^\circ$ in the range of 9.5 to 27.3° . See Martin, Fig. 3 and example II at cols. 18-19.

Lin does not disclose that the binder resin comprises the polyester resin recited in the instant claims. However, Lin discloses that the binder resin may equally be a polyester resin. Lin, paragraph 0060, line 6.

JP'515 teaches that the binder resin in a single-layered photoreceptor may comprise a polycarbonate resin and a polyester resin comprising a biphenylfluorene structure that meets the polyester compositional limitation recited in the instant claims. The discussion of JP'515 in paragraph 17, supra, is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Lin and JP'515, to use (4-n-butoxycarbonyl-9-fluorenylidene) malononitrile as the electron transfer material and the binder resin taught by JP'515 as the binder resin in the single-layered photoreceptor disclosed by JP'509, because that person would have had a reasonable expectation of successfully obtaining an

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electrophotographic single-layered photoreceptor having the benefits disclosed by JP'515.

21. Claims 9, 10, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin, as evidenced by the ACS File Registry Number RN 26201-32-1 and Martin, combined with JP'515 and Healy.

Lin combined with the teachings of JP'515 renders obvious a single-layered photoreceptor as described in paragraph 20 above, which is incorporated herein by reference.

Lin further discloses that said single-layered photoreceptor is obtained by the following steps: (1) roll milling titanyl phthalocyanine (TiOPC(IV)) and the polycarbonate resin in a solvent with milling steel balls to form a pigment dispersion; (2) mixing the polycarbonate resin with the hole transport material, the electron transport material, and a solvent until the solids are dissolved; (3) mixing the pigment dispersion of step (1) with the solution of step (2) to form a coating liquid; and (4) coating an aluminum drum with the coating liquid to form the single-layered photoreceptor drum. See example 1.

Lin does not explicitly disclose removing the milling steel balls from the pigment dispersion after formation of said

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dispersion. However, Lin does not disclose that the steel balls are part of the single-layered photoreceptor. Moreover, it is well-known in the art of forming pigment dispersions to remove the milling beads after forming the pigment dispersion liquids. See Healy, col. 7, lines 64-67, which discloses that after forming a pigment dispersion liquid, the dispersion liquid is strained through a cone sieve to remove the milling beads.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Lin and JP'515, to use (4-n-butoxycarbonyl-9-fluorenylidene) malononitrile as the electron transfer material and the binder resin taught by JP'515 as the binder resin in the method disclosed by Lin, because that person would have had a reasonable expectation of successfully obtaining a single-layered photoreceptor having the benefits disclosed by JP'515. It would have also obvious for that person, in view of the teachings in Healy, to remove the milling steel balls from the pigment dispersion in method rendered obvious over the combined teachings of Lin and JP'515, because that person would have had a reasonable expectation of successfully removing the milling balls used to form the pigment dispersion and obtaining a single-layered photoreceptor having the benefits disclosed by JP'515.

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22. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

23. Claims 1, 2, and 17-20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-7, and 9-19 of copending Application No. 10/459,720 (Application'720) in view of Hamasaki.

This is a provisional obviousness-type double patenting rejection.

Reference claim 3, which depends from reference claim 1, recites a single-layered photoreceptor comprising an electrically conductive substrate having thereon a layer comprising a particular polyester binder resin, a hole transfer material, and a charge generating material. Reference claim 5,

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which depends on reference claim 1, recites that the particular polyester resin may have be represented by the chemical formula recited in the instant claims. Reference claim 4, which depends from reference claim 1, further requires that the layer further comprise an electron transport. Reference claim 14, which depends from reference claim 13, recites an electrophotographic cartridge comprising a photoreceptor comprising an electrically conductive substrate having thereon a layer comprising the particular polyester binder resin, as recited in reference claim 3, and a hole transfer material. Reference claim 16, which depends from reference claim 15, recites an electrophotographic drum comprising a photoreceptor disposed on the drum comprising an electrically conductive substrate having thereon a layer comprising the particular polyester binder resin, as recited in reference claim 3, and a hole transfer material. Reference claim 18, which depends from reference claim 17, recites an imaging apparatus comprising a photoreceptor unit comprising an electrophotographic photoreceptor comprising an electrically conductive substrate having thereon a layer comprising the particular polyester binder resin, as recited in reference claim 3, and a hole transfer material.

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The reference claims do not recite that the charge generating material is a titanyloxy phthalocyanine as recited in the instant claims.

Hamasaki discloses titanyl phthalocyanine crystals that exhibit at least two main peaks at Bragg angle $2\theta \pm 0.2$ in the range of 9.5° and 24.1° as recited in the instant claims. The discussion of Hamasaki in paragraph 18 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the subject matter recited in Application'720 and the teachings of Hamasaki, to make and use a single-layered photoreceptor comprising Hamasaki's titanyl phthalocyanine crystals as the charge generating material, such that the resultant photoreceptor meets the limitations recited in the instant claims, because that person would have had a reasonable expectation of successfully obtaining a positively charged single-layered photoreceptor and an imaging apparatus, which comprises an electrophotographic photoreceptor cartridge or a drum that comprise said photoreceptor, having good stable sensitivity characteristics.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L.

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Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The central fax phone number is (703) 872-9306.

Any inquiry of papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Claudia Sullivan, whose telephone number is (571) 272-1052.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JLD

Aug. 15, 2004

Janis L. Dote
JANIS L. DOTE
PRIMARY EXAMINER
GROUP 1500
1700